UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/802,165	03/08/2001	Byung-Jin Chun	678-623 (P9782)	6181

28249   7590   08/26/2005

DILWORTH & BARRESE, LLP
333 EARLE OVINGTON BLVD.
UNIONDALE, NY 11553

EXAMINER
IQBAL, KHAWAR

ART UNIT	PAPER NUMBER
2686	

DATE MAILED: 08/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	09/802,165	CHUN ET AL.
	Examiner	Art Unit	
	Khawar Iqbal	2686	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>03</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>07 July 2005</u>.
2a) ☐ This action is **FINAL.**   2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>6,9-24,,33-43</u> is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☒ Claim(s) <u>6,9-24 and 33-35</u> is/are allowed.
6) ☒ Claim(s) <u>36-43</u> is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☒ Claim(s) <u>25 and 27-31</u> are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a)☐ All b)☐ Some * c)☐ None of:
      1.☐ Certified copies of the priority documents have been received.
      2.☐ Certified copies of the priority documents have been received in Application No. _____.
      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2.   Claims 36,38,40,42 are rejected under 35 U.S.C. 102(e) as being unpatentable by

Kuwahara et al (6597679).

Regarding claim 36 Kuwahara et al teaches a base station device that has an antenna

array and received forward fading information from a mobile station in a mobile

communication system, comprising (figs. 1-4):

a reverse processor for processing a reverse signal received through the antenna array; a

forward fading information extraction unit for extracting forward fading information from the

received reverse signal (col. 3, lines 13-32, col. 6, lines 13-63, col. 7, lines 1-43, col. 8, lines 39-

50); a forward fading power calculator for calculating a forward fading power for each path

based on the extracted forward fading information (col. 2, lines 1-40, col. 3, lines 13-32, col. 6,

lines 13-63, col. 8, lines 39-50); an array vector calculator for calculating an array vector for

each path from the reverse signal; a transmission correlation matrix calculator for calculating a

transmission correlation matrix using the forward fading powers and the array vectors (col. 3,

lines 13-32, col. 6, lines 13-63, col. 8, lines 39-50); a weight vector calculator for calculating a

weight vector from the transmission correlation matrix, updating an existing weight vector with

the calculated weight vector, and outputting the updated weight vector as a control signal to a

transmission beam generator; and a forward processor comprising the transmission beam

generator for generating a transmission beam for a transmission message based on the weight

vector (col. 2, lines 1-40, col. 3, lines 13-32, col. 6, lines 13-63, col. 8, lines 39-50);

wherein the forward fading information extraction unit comprises:

a forward fading decoder for decoding forward fading information for each path fed back

from a mobile station from the received reverse signal of the reverse processor (col. 2, lines 1-

40, col. 3, lines 13-32, col. 6, lines 13-63, col. 8, lines 39-50); and

a forward fading extractor for extracting a forward fading coefficient from the decoded

forward fading information (col. 2, lines 1-40, col. 3, lines 13-32, col. 6, lines 13-63, col. 8,

lines 39-50).

Regarding claim 38 Kuwahara et al teaches a base station device that has an antenna

array and received forward fading information from a mobile station in a mobile

communication system, comprising (figs. 1-4):

a reverse processor for processing a reverse signal received through the antenna array

(col. 3, lines 13-67, col. 7, lines 1-43);

a forward fading information extraction unit for extracting forward fading information

from the received reverse signal (col. 7, lines 1-43);

a forward fading power calculator for calculating forward fading power for each path

based on the extracted forward fading information, calculating an average reverse fading power

from the reverse signal, and selecting the forward fading power if the mobility of the mobile

station is lower than a predetermined threshold and the average reverse fading power if the

mobility of the mobile station is greater than the threshold (col. 2, lines 1-41, col. 4, lines 5-67,

col. 5, lines 48-62, col. 6, lines 14-26, col. 8, lines 24-50);

an array vector calculator for calculating an array vector for each path from the reverse

signal (col. 3, lines 13-65, col. 8, lines 24-50, see above);

a transmission correlation matrix calculator for calculating a transmission correlation

matrix using the forward fading powers and the array vectors (col.8, lines 5-40);

a weight vector calculator for calculating a weight vector from the transmission

correlation matrix, updating an existing weight vector with the calculated weight vector, and

outputting the updated weight vector as a control signal to a transmission beam generator (col.

2, lines 1-41, col. 4, lines 5-67, col. 5, lines 48-62, col. 6, lines 14-26, col. 8, lines 24-50); and

a forward processor comprising the transmission beam generator for generating a

transmission beam for a transmission message based on the weight vector (col.8, line 40-col. 9,

line 11, see above);

wherein the forward fading information extraction unit comprises:

a forward fading decoder for decoding forward fading information for each path fed back

from a mobile station from the received reverse signal of the reverse processor (col. 2, lines 1-

40, col. 3, lines 13-32, col. 6, lines 13-63, col. 8, lines 39-50); and

a forward fading extractor for extracting a forward fading coefficient from the decoded

forward fading information (col. 2, lines 1-40, col. 3, lines 13-32, col. 6, lines 13-63, col. 8,

lines 39-50).

Regarding claim 40 Kuwahara et al teaches a forward signal transmitting method for a

base station that has an antenna array and received forward fading information from a mobile

station in a mobile communication system, comprising the steps of (figs. 1-4): decoding the

forward fading information for each path fed back from a mobile station from the received

reverse signal of the reverse processor; extracting a forward fading coefficient from the decoded

forward fading information (col. 2, lines 1-40, col. 3, lines 13-32, col. 6, lines 13-63, col. 8,

lines 39-50);

calculating a forward fading power for each path based on the extracted forward fading

coefficient (col. 3, lines 13-31, col. 6, lines 13-62, col. 7, lines 1-43); calculating an array vector

for each path from the reverse signal; calculating a weight vector based on the forward fading

powers and array vectors and updating an existing weight vector with the calculated weight

vector; and forming a transmission beam for a transmission message based on the weight vector

and outputting the transmission beam through the antenna array (col. 3, lines 13-31, col. 6, lines

13-62, col. 8, lines 25-55).

Regarding claim 42 Kuwahara et al teaches a forward signal transmitting method for a

base station device that has an antenna array and received forward fading information from a

mobile station in a mobile communication system, comprising the steps of (figs. 1-4):

decoding the forward fading information for each path fed back from a mobile station

from the received reverse signal of the reverse processor; extracting a forward fading coefficient

from the decoded forward fading information (col. 2, lines 1-40, col. 3, lines 13-32, col. 6, lines

13-63, col. 8, lines 39-50);

calculating forward fading power for each path based on the extracted forward fading

coefficient, calculating an average reverse fading power from the reverse signal, and selecting

the forward fading power if the mobility of the mobile station is lower than a predetermined

threshold and the average reverse fading power if the mobility of the mobile station is greater

than the threshold; calculating an array vector for each path from the reverse signal (col. 9,

lines 21-55, col. 10, lines 12); calculating a weight vector based on the forward fading powers

and array vectors and updating an existing weight vector with the calculated weight vector (col.

9, lines 21-55, col. 10, lines 12); and forming a transmission beam for a transmission message

based on the weight vector and outputting the transmission beam through the antenna array (col.

3, lines 13-31, col. 6, lines 13-62).

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

4.   Claims 37,39,41 and 43 rejected under 35 U.S.C. 103(a) as being unpatentable over

Kuwahara et al (6597679) and further in view of Ogawa et al (WO 200079702), reference US

6590532 for translation.

Regarding claims 37,39 Kuwahara et al teaches a base station device that has an antenna

array and received forward fading information from a mobile station in a mobile

communication system, comprising (col. 2, lines 1-40):

a reverse processor for processing a reverse signal received through the antenna array

(col. 3, lines 66-67);

a forward fading information extraction unit for extracting forward fading information

from the received reverse signal (col. 3, lines 13-32, col. 6, lines 13-63, col. 7, lines 1-43, col. 8,

lines 39-50);

a forward fading power calculator for calculating an average reverse fading power and a

frequency from the received reverse signal and calculating a current forward fading power for

each path by a predetermined prediction method based on a plurality of previous forward fading

coefficients for each path, the average reverse fading power, and the frequency (col. 3, lines 13-

32, col. 6, lines 13-63, col. 8, lines 39-50);

an array vector calculator for calculating an array vector for each path from the reverse

signal (col.3, lines 41-65, col. 8, lines 24-50, see above);

a transmission correlation matrix calculator for calculating a transmission correlation

matrix using the forward fading powers and the array vectors (col.4, lines 30-65, see above);

a weight vector calculator for calculating a weight vector from the transmission

correlation matrix, updating an existing weight vector with the calculated weight vector, and

outputting the updated weight vector as a control signal to a transmission beam generator, and a

forward processor comprising the transmission beam generator for generating a transmission

beam for a transmission message based on the weight vector (col. 2, lines 1-41, col. 4, lines 5-

67, col. 7, lines 1-43, col. 6, lines 13-63, col. 8, lines 39-50). Kuwahara et al teaches wherein if

the forward signal forms a beam, the forward fading estimator estimates complex forward

fading information and severity information (col. 3, lines 13-65, col. 6, lines 13-62, col. 7, lines

1-43 col. 8, line 39-col. 9). Kuwahara et al does not specifically teach Doppler frequency from

the received reverse signal.

In an analogous art, Ogawa et al teaches a Doppler frequency from the received reverse signal (col. 21, line 63-col. 22, line 10,col. 23, lines 15-60). A radio device (1000) separates the signal from a specific terminal among from the signals from adaptive array antennas (1 to 4) according to a reception weight vector calculated by a reception weight vector calculator (20). A reception coefficient vector calculator (22) derives an impulse response of a propagation path of the signal from the specified signal. A transmission coefficient vector inferring device (32) predicts the propagation path at the transmission time from the results of the inference by the reception coefficient vector (22). A transmission weight vector calculator (30) controls the antenna directivity at the transmission time according to the results of the prediction by the transmission coefficient vector inferring device (32). In such a way, the degradation of the error rate of the downstream line due to time difference between the upstream and downstream lines can be suppressed. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device of Kuwahara et al by specifically adding from the received reverse signal in order radio device which separates signal from specific terminal among from signals from adaptive array antenna.

Regarding claims 41,43 Kuwahara et al teaches a forward signal transmitting method for a base station device that has an antenna array and received forward fading information from a mobile station in a mobile communication system, comprising the steps of:

extracting forward fading information from a reverse signal received through the antenna array and storing the extracted forward fading information (col. 3, lines 13-31, col. 6, lines 13-62, col. 7, lines 1-43); calculating an average reverse fading power and a Doppler frequency from the received reverse signal and calculating a current forward fading power for each path

by a predetermined prediction method based on a plurality of previous forward fading

coefficients for each path, the average reverse fading power, and the Doppler frequency (col. 3,

lines 13-31, col. 6, lines 13-62, col. 7, lines 1-43); calculating an array vector for each path

from the reverse signal; calculating a weight vector based on the forward fading powers and

array vectors and updating an existing weight vector with the calculated weight vector(col. 9,

lines 21-55, col. 10, lines 12); and forming a transmission beam for a transmission message

based on the weight vector and outputting the transmission beam through the antenna array (col.

3, lines 13-31, col. 6, lines 13-62). Kuwahara et al teaches wherein if the forward signal forms a

beam, the forward fading estimator estimates complex forward fading information and severity

information (col. 3, lines 13-65, col. 6, lines 13-62, col. 7, lines 1-43 col. 8, line 39-col. 9).

Kuwahara et al does not specifically teach Doppler frequency from the received reverse signal.

In an analogous art, Ogawa et al teaches a Doppler frequency from the received reverse

signal (col. 21, line 63-col. 22, line 10,col. 23, lines 15-60). A radio device (1000) separates the

signal from a specific terminal among from the signals from adaptive array antennas (1 to 4)

according to a reception weight vector calculated by a reception weight vector calculator (20).

A reception coefficient vector calculator (22) derives an impulse response of a propagation path

of the signal from the specified signal. A transmission coefficient vector inferring device (32)

predicts the propagation path at the transmission time from the results of the inference by the

reception coefficient vector (22). A transmission weight vector calculator (30) controls the

antenna directivity at the transmission time according to the results of the prediction by the

transmission coefficient vector inferring device (32). In such a way, the degradation of the error

rate of the downstream line due to time difference between the upstream and downstream lines

can be suppressed. Therefore, it would have been obvious to one of ordinary skill in the art at

the time the invention was made to modify the device of Kuwahara et al by specifically adding

from the received reverse signal in order radio device which separates signal from specific

terminal among from signals from adaptive array antenna.

Allowable Subject Matter

5.   Claims 6,9-24,33-35 are allowed. The following is a statement of reasons for the

indication of allowable subject matter (see last action): As 6,9-24,33-35, the teaching of prior

arts either alone or combine fail to teach all the limitations as recited claimed.

Response to Arguments

6.   Applicant's arguments with respect to claims 37,39,41,43 have been considered but are

moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the

Examiner should be directed to Khawar Iqbal whose telephone number is (571) 272-7909.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's

supervisor, Marsha D. Banks-Harold can be reached on (571) 272-7905. The fax phone number

for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for published

applications may be obtained from either Private PAIR or Public PAIR. Status

information for unpublished applications is available through Private PAIR only. For

more information about the PAIR system, see http://pair-direct.uspto.gov. Should you

have questions on access to the Private PAIR system, contact the Electronic Business

Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028.

Any inquiry of a general nature or relating to the status of this application or proceeding

should be directed to the receptionist/customer service whose telephone number is (571) 272-

2600.

Khawar Iqbal

MARSHA D. BANKS-HAROLD
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600